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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,399	10/19/2001	Robert G. Batchko	BAT-101	2085
27652	7590	01/24/2006	EXAMINER	
JOSHUA D. ISENBERG 204 CASTRO LANE FREMONT, CA 94539			BOUTSIKARIS, LEONIDAS	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

Office Action Summary	Application No.	Applicant(s)	
	10/029,399	BATCHKO, ROBERT G.	
	Examiner	Art Unit	
	Leo Boutsikaris	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-53, 146 and 147 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-53, 146-147 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2-7, 9-11, 13-14, 17-20, 28-31, 37-40, 47-48, 147 are rejected under 35

U.S.C. 102(b) as being anticipated by Hinton (US 4,764,890).

Regarding claims 2-3, 6, Hinton discloses an optical processor (Fig. 1a) comprising an optical module 120, wherein the optical module 120 includes a plurality of addressable optical elements 121-129 (only 9 shown), see line 63, col. 4 to line 32, col. 5. The optical module 120 includes an optical medium having a plurality, e.g. nine subsections that define the addressable optical elements, and means for altering the optical properties of the subsections, in the form of optical address beams 150, 151 and 153, 154 (lines 54-65, col. 5, 36-46, col. 6). Furthermore, Hinton teaches that, in one embodiment, the addressable optical elements may be positioned in series (lines 19-21, col. 5).

Regarding claims 4, 14, the optical medium is an electro-optic medium (lines 20-50, col. 8).

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Regarding claims 5, 17-18, the means for altering the optical properties include contact pads proximate to the optical medium and a voltage source 203 coupled to the contact pads (Fig. 2).

Regarding claim 7, two or more of the modules like 120 can be linked so that optical transforms such as logic operations may be performed along two axes relative to the optical axis (lines 47-51, col. 6).

Regarding claims 9-11, the addressable optical elements, e.g., SEED devices, exhibit non-linear optical characteristics (see Fig. 3a), which includes at least a second and a third order term.

Regarding claim 13, the optical processor of Fig. 1 includes a plurality of address beam sources in the form of holograms 101-107, each of which produces an address beam that interacts with a corresponding subsection of the optical medium of 120 to alter the optical properties of the subsection.

Regarding claims 19-20, dispersed optics in the form of semiconductor (MQW) is disposed proximate to the contact pads (lines 20-24, col. 8 and Fig. 2).

Regarding claims 28-29, each of the addressable optical elements performs an optical logic function, e.g., a NOR function, which can be considered as a filtered version of the inputs. Furthermore, the input may be an object distribution, in which case the output can be considered as an image. Finally, since each element can act as an OR or NOR gate, depending on the bias beam, the processor performs 2^N functions in total.

Regarding claims 30-31, 147, all the transforms are related (i.e., OR, NOR, NAND are all related transforms), and if they are all the same then the n^{th} transform is related to the $(n+1)^{\text{th}}$ transform in the same way the $(n-1)^{\text{th}}$ transform is related to the n^{th} transform.

Regarding claim 37, the elements of 120 comprise non-linear optics elements.

Regarding claims 38, 47-48, the optical elements can be randomly addressed to the extent that they respond to received inputs, which may be random, and the state of each element is determined by a control signal e.g., 150 and 151, which is optical.

Regarding claim 39, each addressable optical element is characterized by two states (lines 48-50, col. 5).

Regarding claim 40, each of the two states is characterized by a different value of an optical property such as optical transmission through the optical element.

Claims 2, 6, 8, 12, 14-16, 21-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishimoto (GB 2171535).

Regarding claims 2, 6, Nishimoto discloses an optical processor (Fig. 5) comprising an optical module, wherein the optical module includes n addressable optical elements 2_2-2_n , where $n > 2$, the optical elements being positioned in series. The optical module includes an optical medium having n subsections that define the addressable optical elements (in the same sense as in Fig. 2A of the present specification).

Regarding claim 8, the device of Fig. 5 can be considered as having a first and a second optical module, each module performing a lens operation along an axis.

Regarding claim 12, the optical medium may be KH_2PO_4 (line 51, p. 2).

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Regarding claims 14-16, the optical medium further includes a liquid crystal lens element 6, which has two or more states of its refractive index depending on the applied voltage (lines 23-25, 34-37, p. 2).

Regarding claims 21-22, there is liquid crystal material dispersed within the electro-optic medium, constituting lens element 6.

Regarding claim 23, each the electro-optic medium includes a birefringent material 3_j, $j=2-n$ (lines 112-113, p. 2).

Regarding claim 25, the electro-optic medium further includes polarization rotators 2₂-2_n (lines 111-112, p. 2).

Regarding claim 26, the polarization rotators are electro-optic half-wave plates (line 59-62, p.1).

Regarding claim 27, the device further includes a polarizer 1 (line 53, p. 1).

Regarding claim 24, the combination of the dispersed optics have different refractive index along different polarization axes.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2, 6, 32-36, 41-46, 49-53, 146 are rejected under 35 U.S.C. 102(e) as being anticipated by Popovich (US 6,356,366).

Regarding claims 2, 146, Popovich discloses an optical processor (Fig. 1) comprising an

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optical module 10, wherein the optical module 10 includes a plurality of addressable optical elements 26, 28, 30, wherein the addressable optical elements are positioned in series (lines 32-65, col. 2).

Regarding claim 6, the optical module includes an optical medium having n ($n=3$) subsections that define the addressable optical elements (in the same sense as in Fig. 2A of the present specification).

Regarding claims 32-34, each of elements 26, 28, 30 has two states (either diffracting/focusing incident light, or just allowing the incident light to pass through), thus the module having 2^N transforms, wherein each of the elements images an input object at a different focus point, all of which lie along the same optical axis (lines 15-29, col. 5), and are uniformly spaced (since the elements are identical).

Regarding claim 35, each of the 2^N transforms images the object at a different magnification corresponding to the respective focal points along the optical axis.

Regarding claim 36, each of the different focal points corresponds to a respective diffraction/deflection from the optical elements (see Fig. 1).

Regarding claim 41, each of the addressable optical elements is a holographic optical element (lines 19-20, col. 3).

Regarding claim 42, the holographic optical element is a holographic lens in the form of fringes incorporated within a liquid crystal structure (lines 38-49, col. 3, 8-14, col. 4).

Regarding claims 43, 46, the optical property that varies is the focal length of the module.

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Regarding claims 44-45, each of the holographic optical lenses is a thin lens because of the small axial size, thus producing a composite focal length given by the equation of claim 44 (for illustration purposes only, see equation 5.39 in Hecht).

Regarding claims 49-53, the focal length of the module is determined by the status of each holographic lens, which in turn is determined by the value of an applied voltage, which is typically digital, comprising a plurality of bits, which correspond to the various values of the composite focal length of the module. Each digital input voltage signal results in a corresponding analog output optical signal (e.g., an image).

Response to Arguments

Applicant's arguments filed on 11/4/2005 have been fully considered but they are not persuasive.

Regarding Applicant's argument that none of the cited references shows the addressable optical elements being in series, the examiner respectfully disagrees, and notes that Hinton explicitly discloses an embodiment where the optically addressable optical elements are in series (lines 19-21, col. 5), and furthermore each of Nishimoto (e.g., Fig. 5) and Popovich (e.g., Fig. 1) shows optical processing systems where the individual optical elements are positioned one after the other such that input light travels through each one of them.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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January 21, 2006


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